INTERNATIONAL STANDARD

ISO 13688

Second edition
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Protective clothing — General requirements

Vêtements de protection — Exigences générales

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13688 was prepared by Technical Committee ISO/TC 94, *Personal safety - Protective clothing and equipment*, Subcommittee SC 13, *Protective clothing* and by Technical Committee CEN/TC 162, *Protective clothing including hand and arm protection and lifejackets* in collaboration.

This second edition cancels and replaces the first edition (ISO 13688:1998), which has been technically revised to include the following changes:

- A statement that this International Standard (and pictogram) is intended to be used in combination with another product standard was added to the Scope.
- Additional definitions on waist to waist over the shoulder length, and torso.
- Notes on level of performance moved to informative Annex A.
- Clause 4 on ergonomics changed to basic health and ergonomic requirements and revised into separate sub-sections: general (4.1), innocuousness (4.2), design (4.3) and comfort (4.4).
- Informative Annex C added on ergonomic features.
- Subclause 5.2 on colour fastness removed.
- Subclause 5.3 on cleaning renamed as washing and dry-cleaning (5.2) now includes reference to standardised processes, including industrial washing.
- Strengthened provisions in 5.3 on dimensional change due to cleaning.
- The size designation system in Clause 6 was simplified with regard to intervals and ranges to allow more freedom to obtain a better individual fit.
- Subclause 7.2 on specific marking amended to include qualification labelling for industrial laundry care.
- Informative Annex B (Flow chart) added on acceptability of materials.
- Informative Annex F added on environmental aspects.

Introduction

This International Standard is a reference standard to be called up as appropriate by specific standards. This International Standard is not intended to be used alone but only in combination with another standard containing requirements for the specific performance of the product which provides protection.

Protective clothing — General requirements

1 Scope

This International Standard specifies general performance requirements for ergonomics, innocuousness, size designation, ageing, compatibility and marking of protective clothing and the information to be supplied by the manufacturer with the protective clothing.

This International Standard is only intended to be used in combination with other standards containing requirements for specific protective performance and not on a stand-alone basis.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3071, *Textiles — Determination of pH of aqueous extract*

ISO 3175-1, *Textiles — Professional care, drycleaning and wetcleaning of fabrics and garments — Part 1: Assessment of performance after cleaning and finishing*

ISO 3635, *Size designation of clothes — Definitions and body measurement procedure*

ISO 3758, *Textiles — Care labelling code using symbols*

ISO 4045, *Leather — Chemical tests — Determination of pH*

ISO 5077, *Textiles — Determination of dimensional change in washing and drying*

ISO 7000, *Graphical symbols for use on equipment — Registered symbols*

ISO 17075, *Leather — Chemical tests — Determination of chromium(VI) content*

ISO 30023, *Textiles — Qualification symbols for labelling workwear to be industrially laundered*

EN 1811, *Reference test method for release of nickel from products intended to come into direct and prolonged contact with the skin*

EN 14362-1, *Textiles — Methods for determination of certain aromatic amines derived from azo colorants — Part 1: Detection of the use of certain azo colorants accessible with and without extracting the fibres*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
ageing
change of one or more initial properties of protective clothing materials during the passage of time

3.2
hazard
situation which can be the cause of harm or damage to the health of the human body

Note 1 to entry: There are different general types of hazards, e. g. mechanical hazards, chemical hazards, cold hazards, heat and/or fire hazards, biological agents hazards, radiation hazards. Certain types of these hazards can, according to circumstances, derive from more specific hazards. Thus, a heat hazard can derive from contact heat, radiant heat etc. for each of which there can be separate test methods.

Particular garments have been designed to give protection against the hazards encountered in specific types of activities. Examples of such garments are aprons that provide protection against hand knives, trousers for use with chainsaws, clothing for protection against chemicals, high visibility clothing and motorcycle rider's protective clothing.

3.3
risk
combination of the frequency, or probability, of occurrence and the consequence of a specified hazardous event

Note 1 to entry: The concept of risk always has two elements: the frequency or probability with which a hazardous event occurs and the consequences of the hazardous event.

3.4
performance level
number that designates a particular category or range of performance by which the results of testing can be graded

Note 1 to entry: For further information see Annex A.

3.5
protective clothing
clothing including protectors which cover or replace personal clothing, and which is designed to provide protection against one or more hazards

3.6
waist to waist over the shoulder length
maximum length measured from the plane of the waist over the shoulder to the plane of the waist

Note 1 to entry: See also Clause 6.

3.7
torso
thorax and abdomen or section of the body to which the limbs, head and neck are attached

4 Basic health and ergonomic requirements

4.1 General

In the following paragraphs some basic health and ergonomic requirements are stated that are relevant for many types of protective clothing.

NOTE For general ergonomic principles to be used in designing and specifying personal protective equipment see EN 13921.[7]

Protective clothing shall be designed and manufactured as follows.

4.2 Innocuousness

Protective clothing shall not adversely affect the health or hygiene of the user. The materials shall not, in the foreseeable conditions of normal use, release substances generally known to be toxic, carcinogenic, mutagenic, allergenic, toxic to reproduction or otherwise harmful.

NOTE 1 Information on the classification and identification of harmful substances can be found, e.g. in[9] of the Bibliography.

NOTE 2 Guidance on how to consider acceptability of materials in protective clothing is given in the flow chart in informative Annex B (Figure B.1).

The following list of documents is given for information and as examples of documents to be examined:

— Information supplied by the manufacturer could include evidence-based information confirming that the product does not contain any substances at levels that are known or suspected to adversely affect user hygiene or health,

— Materials specifications,

— Safety data sheets relating to the materials,

— Information relating to the suitability of the materials for use with food, in medical devices, or other relevant applications,

— Information relating to toxicological, allergenic, carcinogenic, toxic to reproduction or mutagenic investigations on the materials,

— Information relating to ecotoxicological and other environmental investigations on the materials.

Materials should be selected to minimize the environmental impact of the production and disposal of protective clothing (see also Annex F).

The examination shall determine whether the claim that the materials are suitable for use in the protective clothing or protective equipment is justified. Particular attention shall be paid to the presence of plasticisers, unreacted components, heavy metals, impurities and the chemical identity of pigments and dyes.

Each layer of material of the protective clothing shall comply with the following requirements:

a) Chromium VI content in leather clothing shall not exceed 3 mg/kg according to ISO 17075.

b) All metallic materials which could come into prolonged contact with the skin (e.g. studs, fittings) shall have a release of nickel of less than 0,5 μg/cm^2 per week. The method of test shall be according to EN 1811.

c) Protective clothing material shall have a value greater than pH3,5 and less than pH9,5. The test method for leather shall be according to ISO 4045 and for textile materials according to ISO 3071.

d) Azo colorants which release carcinogenic amines listed in EN 14362-1 shall not be detectable by the method in these standards.

4.3 Design

4.3.1 The design of protective clothing shall facilitate its correct positioning on the user and shall ensure that it remains in place for the foreseeable period of use, taking into account ambient factors, together with the movements and postures that the wearer could adopt during the course of work or other activity. For this purpose, appropriate means, such as adequate adjustment systems or adequate size ranges shall be provided so as to enable protective clothing to be adapted to the morphology of the user. (See Annex C).

4.3.2 The design of protective clothing shall ensure that no parts of the body get uncovered by expected movements by the wearer (e.g. a jacket should not rise above the waist when the arms are raised) if

this is defined in the specific standard. The specific standard for protective clothing shall contain test criteria (for example: checking that the garment can be put on and taken off easily; that arm and knee and bending movements are possible; that unprotected body areas do not appear during movements; that there is an adequate overlap of jacket and trousers; that the manufacturers information is adequate to explain the correct usage of the protective clothing). (See Annex C).

4.3.3 Where applicable, protective clothing design shall take into account other items of protective clothing or equipment from the same manufacturer which must be worn to form an overall protective ensemble. When two or more items are worn together, they should be compatible and each one shall comply with its own standard. None of them has to reduce the performance of the other item(s) and the appropriate level of protection should be provided at interface areas between those products, for example in sleeve to glove, trousers to footwear, hood and respirator combinations. There may be other combinations.

4.3.4 In each specific standard, a minimum mechanical property to assess the strength of a garment shall be defined.

4.4 Comfort

4.4.1 Protective clothing shall provide users with a level of comfort consistent with the level of protection required against the hazard which is present, the ambient conditions, the level of the user's activity, and the anticipated duration of use of the protective clothing.

Protective clothing shall not

— have rough, sharp or hard surfaces that irritate or injure the user;

— be so tight, loose and/or heavy so that it restricts normal movement (see Annex C).

4.4.2 Protective clothing that imposes significant ergonomic burdens such as heat stress, or is inherently uncomfortable because of the need to provide adequate protection, shall be accompanied in the information supplied by the manufacturer by specific advice or warnings. Specific advice on the appropriate duration for continuous use of the clothing in the intended application(s) shall be given.

5 Ageing

5.1 General

This International Standard is concerned only with the dimensional change caused by cleaning on the performance of the clothing and legibility of marking (see 5.3).

5.2 Washing and dry cleaning

The cleaning shall be in accordance with the manufacturer's instructions, on the basis of standardized processes. If the number of cleaning cycles is not specified, five cleaning cycles shall be performed. This shall be reflected in the information supplied by the manufacturer.

Where rapid deterioration in performance is caused by the use of cleaning procedures, the manufacturer, in the marking and/or in the information, shall indicate the maximum number of cleaning operations that may be carried out before the protective clothing has to be discarded.

Manufacturers should typically indicate one or several of the various methods and processes of ISO 6330,[5] ISO 15797,[8] ISO 3175 (Parts 2 to 4) [2-3-4] or equivalent standardized processes for cleaning.

NOTE The use of domestic care labels infers their selection according to Annex A of ISO 3758 and that testing to the appropriate parts of ISO 6330 and ISO 3175 has been carried out.

5.3 Dimensional change due to cleaning

If the manufacturer's instructions indicate that garments can be washed or dry cleaned, the test procedure for dimensional change for washing of protective clothing material shall be carried out in accordance with 5.2. Measurement of dimensional change shall be carried out according to ISO 5077 and for dry cleaning in accordance with ISO 3175-1.

Changes in dimension due to cleaning of material for protective clothing shall not exceed ± 3 % for woven materials and ± 5 % for knitted material and nonwovens in either length or width, unless stated otherwise in a specific standard.

One sample shall be subjected to five cleaning cycles according to 5.2. If both industrial washing and domestic washing are permitted, only industrial washing shall be carried out. If the manufacturer includes instructions for washing or washing and dry-cleaning, the garment shall only be wash tested. If only dry-cleaning is allowed, the garment shall be dry-cleaned.

6 General size designation

Protective clothing shall be marked with its size based on body dimensions measured in centimetres. The size designation of each garment shall comprise the control dimensions as given in Table 1. Exceptions shall be specified in detail in the relevant product standards, e.g. Genital protectors for use in sports. Measurement procedures and the designation of dimensions shall correspond to ISO 3635, if not otherwise specified in other product standards (see also Annex D).

The size designation system is required especially for labelling.

The interval figures given in Annex D should not be standardized (flexible approach).

Table 1 — Body dimensions for sizing protective clothing

No	Protective clothing	Control dimensions (ranges expressed as centimetres or kilograms)
1	jacket, coat, vest	chest or bust girth and height
2	trousers	waist girth and height
3	coverall	chest or bust girth and height
4	aprons	chest or bust girth, waist girth and height
5	protective equipment (e.g. knee pads, back protectors, torso protector)	Select the relevant measurement: — chest or bust girth, waist girth and height — body weight — waist to waist over the shoulder length

The manufacturer can also designate additional measurements, e.g. the arm length, the inside leg length or the hip girth for women's garments. The value shall correspond to the actual value in centimetres of the user's body dimensions.

According to ISO 3635 and Annex D, the figures of size designations on the garment series should be used to indicate the size. Examples of size designations are shown in Annex D.

Also taking Annex C into account, product standards or the design criteria used by manufacturers for protective clothing shall take the following into account:

— That if there is a requirement for a zone or zones of protection there shall be a specified numerical relationship between the dimensions of the specific protective materials or constructions in the products, and the size of user.

— That it shall be possible to optimize PPE adaptation to user morphology by all appropriate means, such as adequate adjustment and attachment systems or the provision of an adequate size range.

— That the proportions and the dimensions of the protective clothing shall reflect the needs of the users in the environments where it is to be used, with the clothing to be worn with it, and performing the normal tasks for which it is intended.

7 Marking

7.1 General

Each piece of protective clothing shall be marked.

The marking shall be:

— in the official languages of the state of destination for informative wording (e.g. warning phrases);

— on the product itself or on labels attached to the product;

— affixed so as to be visible and legible;

— durable to the appropriate number of cleaning processes.

The marking and the pictograms should be large enough to convey immediate understanding and to allow the use of readily legible numbers.

The use of numbers not smaller than 2 mm and pictograms not smaller than 10 mm (including the frame) is recommended. Numbers and pictograms are recommended to be black on white background. Warning against mortal hazards should be on the outside of the product.

7.2 Specific

The marking shall include the following information:

a) Name, trademark or other means of identification of the manufacturer or his authorized representative;

b) Designation of the product type, commercial name or code;

c) Size designation according to Clause 6;

d) Identification of the specific product standard;

e) Pictograms and levels of performance, only if required by a product standard. Consequently, the pictogram of Annex E shall appear in the marking together with the specific product standard identification.

None of the pictograms in Annex E shall be placed on the marking unless required by the specific product standard.

As a type designation of a hazard or an application the pictogram shall be used as indicated in the marking requirements of the specific standard (see Tables E.1 and E.2 with pictogram symbols).

Figure 1 shows an example of clothing for protection against heat and flame.

Figure 1 — Example for clothing for protection against heat and flame (ISO 7000-2417)

For classified requirements the number indicating the level of performance shall be shown beside or below the pictogram. These numbers shall always be in the same fixed sequence as required in the specific standard.

If these numbers should be shown beside the pictogram, start at the right hand side of the pictogram and proceed clockwise.

If the manufacturer intends to indicate on the marking that the manufacturer's instructions have to be consulted, then Figure E.2 shall be used.

f) Care labelling and/or qualification labelling

Care labelling and/or qualification labelling shall be given according to ISO 3758 and/or ISO 30023 if relevant.

If there are specific requirements for marking the maximum recommended number of cleaning processes, then the maximum number of processes shall be stated after "max" next to the labelling.

EXAMPLE max 25 x

If the protective clothing can be industrially washed, then this shall be indicated on the care/qualification labelling.

g) Single-use PPE shall be marked with the warning phrase "Do not re-use" and/or with the pictogram according to ISO 7000-1051.

h) Since ISO 13688 is not a stand-alone standard, the number of this International Standard, with or without the shield pictogram, (the basic symbol of protection), shall not appear as the sole marking on any protective clothing.

8 Information supplied by the manufacturer

Protective clothing shall be supplied to the customer with information written at least in the official language(s) of the state of destination. All information shall be unambiguous. The following information shall be given:

a) All information required in 7.2 a), b), e), f), and g).

b) Name and full address of the manufacturer and/or his authorized representative.

NOTE An electronic or other address to which feedback on the product can be sent may be useful

c) Number of the specific product standard and year of publication.

d) Explanation of any pictograms and levels of performance.

e) All main constituent materials of all layers of protective clothing.

f) Instructions for use as appropriate for the specific standard

- tests to be carried out by the wearer before use;
- fitting; how to put on and take off;
- instructions concerning appropriate use of the product to minimize the risk of injury;
- limitations on use (e. g. temperature range);
- instructions for storage and maintenance, with maximum periods between maintenance checks;
- complete instructions for cleaning and/or decontamination (e.g. cleaning temperature, drying process, pH value, mechanical action, maximum number of cleaning cycles, cleaning products);

— warnings against problems likely to be encountered, e.g. domestic washing of contaminated clothing, dangerous improper use;

— details of additional items of protective clothing that need to be used to achieve the protection intended;

— details of any significant ergonomic penalties of using the product such as a reduction of the field of vision, acuity of hearing or a risk of heat stress;

— instructions on how to recognize ageing and loss of performance in the product, e.g. factors which may reduce the protection;

— if helpful, illustrations, part numbers etc. shall be added;

— instruction and training if required, including the level of experience necessary for safe use of the protective clothing;

— instructions concerning repair. Repairs should not impair the performance of the clothing. Instructions should advise, for instance, repair by suitably qualified companies, or a warning not to do it yourself.

g) Reference to accessories and spare parts if relevant.

h) Type of packaging suitable for transport if relevant.

i) Instructions for recycling, safe destruction and disposal as relevant (e. g. mechanical disruption or incinerating the product).

Annex A
(informative)

Performance level

The data from the various tests is used to place garments into one of a number of descriptive performance levels. It has to be remembered that in many accidents there may be forces applied to the body that no known clothing can prevent causing serious injury or death.

Since levels of performance are based upon the results of testing in a laboratory, they do not necessarily relate to actual conditions in the workplace. Thus protective clothing should be selected with a full appreciation of the conditions and tasks related to the end-user process, taking account of the risk involved and of the data supplied by the manufacturer in relation to the performance of the protective clothing against the hazard or hazards in question. Specific product standards define series of performance levels in which a higher number corresponds to a higher performance.

The number of performance levels should be as low as possible, taking into account the reproducibility of the test methods and the hazard(s) to which the users are exposed. Different performance levels can only be justified by the existence of different levels of risk and ergonomic factors, which cannot be adequately covered by a single performance level.

Annex B
(informative)

Flow chart

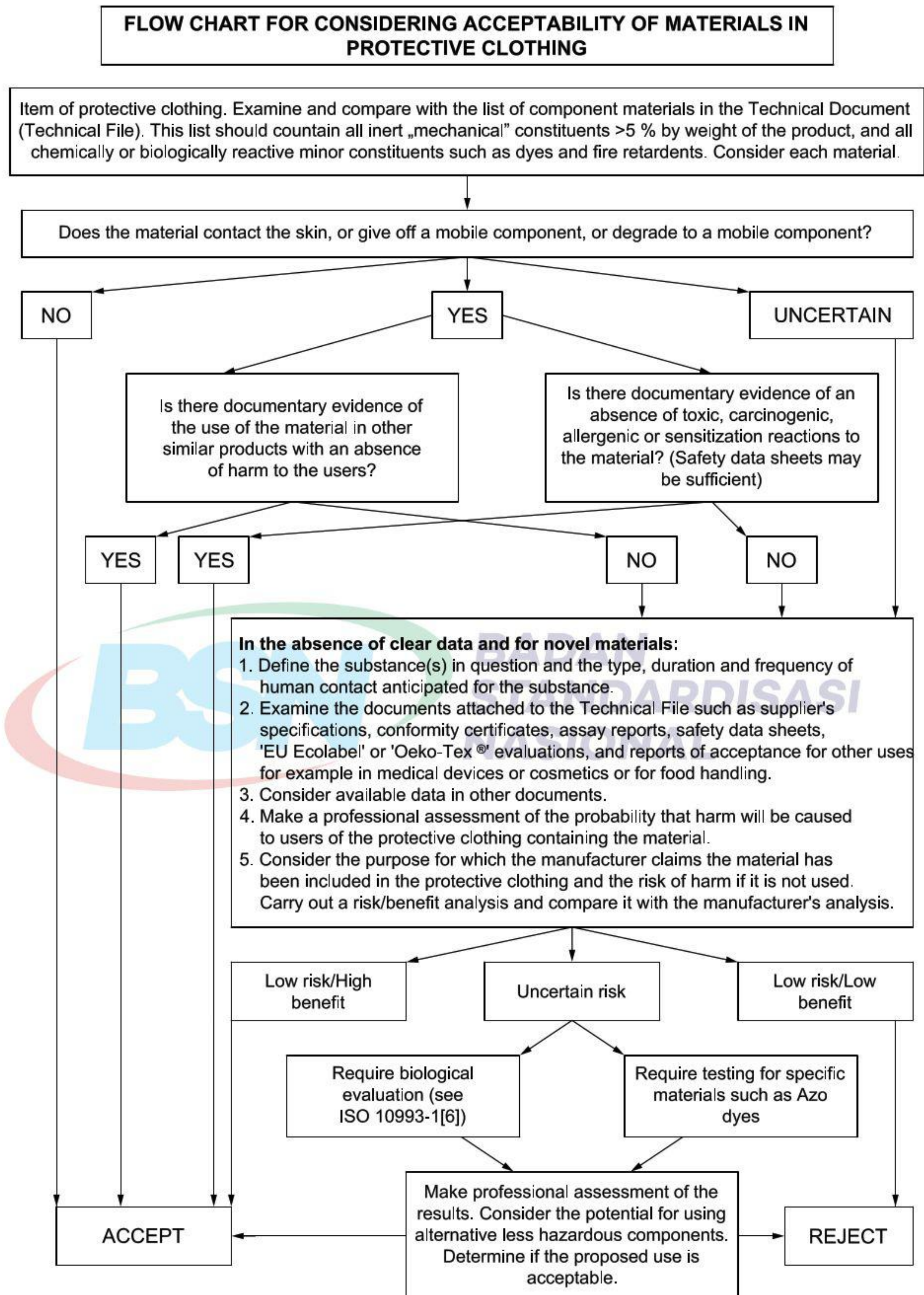



Figure B.1 — Flow chart

Annex C
(informative)

Checking the ergonomic features of protective clothing(Practical performance tests)

C.1 General

This Annex specifies how some basic ergonomic features of protective clothing shall be checked using simple practical tests if these are not already specified in the appropriate related product standards. Ergonomic assessments are intended to reduce the risk of hazards to the user due to such parameters for example as poor design and fit, poor compatibility with other related items of PPE and poor compatibility with other items of clothing.

NOTE Further information and guidance are provided in EN 13921.[7]

C.2 Principle

The checking of protective clothing should be done by one or more experienced assessors who first read the information supplied by the manufacturer, and then examine the protective clothing. The assessor(s) or the suitable test subject(s) then put on test specimen(s) of the clothing of suitable size(s). The protective clothing should be worn with the normal clothing with which it is intended to be used. Simple practical tests are then carried out. A list of questions is provided below. The product is satisfactory if all the answers given are positive.

The answers given to the questions may be YES, NO or CANNOT DECIDE. All "CANNOT DECIDE" responses should if possible be resolved by using additional subjects. Final decisions are made by the assessor(s).

The assessor may have difficulties deciding whether a product is acceptable or unacceptable. In such cases it is recommended that the product should be compared with similar items on the market. If it is significantly worse ergonomically, without redeeming features such as enhanced protection, it can be regarded as unnecessarily uncomfortable. Care will need to be taken if there are no directly comparable products. Care will also have to be taken when protection against mortal danger is intended and 'the state of the art' does not allow comfortable conditions for users, nor perhaps conditions free of harm caused by the protective clothing. Carrying out (subjective) ergonomic assessments will more often result in recommendations for changes to improve protective clothing, than in finding the clothing absolutely does not comply with the minimum requirements of a product standard.

C.3 Assessment

C.3.1 Clothing free from harmful features

Protective clothing should be inspected manually and visually to ensure it is free from any sharp or hard edges, protruding wire ends, rough surfaces or other items on the inner or outer surface of the clothing that are likely to cause harm to the user or others.

C.3.2 Protective clothing, putting on, taking off and fit

The following points should be considered:

— The ease of putting on and removing the clothing with or without assistance as is appropriate for the type of clothing.

— The clothing should not be too tight for comfort and deep breathing is not restricted and there is no blood flow restriction anywhere.

— The clothing design at, for example the armholes and crotch, to check they are appropriately proportioned and positioned.

— Using simple practical tests, the assessor should check whether the information supplied by the manufacturer is sufficiently clear, complete and accurate so that users may be expected to use the clothing correctly, and avoid any hazardous errors in using the product.

C.3.3 Operation of closures, adjustment and restraint systems

The following points should be considered:

— The adequacy of the range of adjustments available

— The ease of operation and the security of closures and adjusters

— Whether the closures, adjusters and restraint systems appear strong enough to withstand the forces to which they are likely to be exposed to during body movements and the tasks for which the protective clothing is intended.

C.3.4 Coverage of the area intended to be protected, coverage maintained during movements

The following points should be considered:

— The adequacy of coverage of any specified protection zones by protective material or special constructions,

— That coverage is maintained during movements as extreme as it is anticipated a user would make.

C.3.5 Freedom of movement

The wearer of the clothing should be able to perform following movements:

— Standing, sitting, walking and stair climbing,

— Raising both hands above the head,

— Bending over and picking up a small object such as a pencil.

The following points should be considered:

— The arms and legs of the clothing should not be so long that they interfere with hand and foot movements.

— The clothing should not be so loose that it flaps about or moves independently and inconveniently.

— There should not be points at which unexpected and unintended gaps open up between or within components of the clothing.

— There should not be any unreasonable restriction of movement at any joint.

C.3.6 Compatibility with other PPE from the same manufacturer

The following points should be considered:

— Protective clothing that is normally worn as part of an ensemble should be compatible with representative examples of the rest of that ensemble.

— Putting on and removing other items of PPE such as gloves and boots should be possible without difficulty.

C.4 Grounds for concluding a product unacceptable

The following are obvious reasons for concluding that a protective clothing product is unacceptable and not fit for use:

a) Subjects it should fit cannot wear it.

b) It does not stay done up, or it will not stay in place.

c) It compromises a vital function, such as breathing.

d) Simple tasks to be performed wearing it are impossible.

e) The subject refuses to continue the assessment due to pain.

f) It prevents the wearing of other essential PPE.

Annex D
(informative)

Examples of size designation

D.1 Examples of size designation for suits, jackets, coats and trousers

All dimensions are in centimetres.

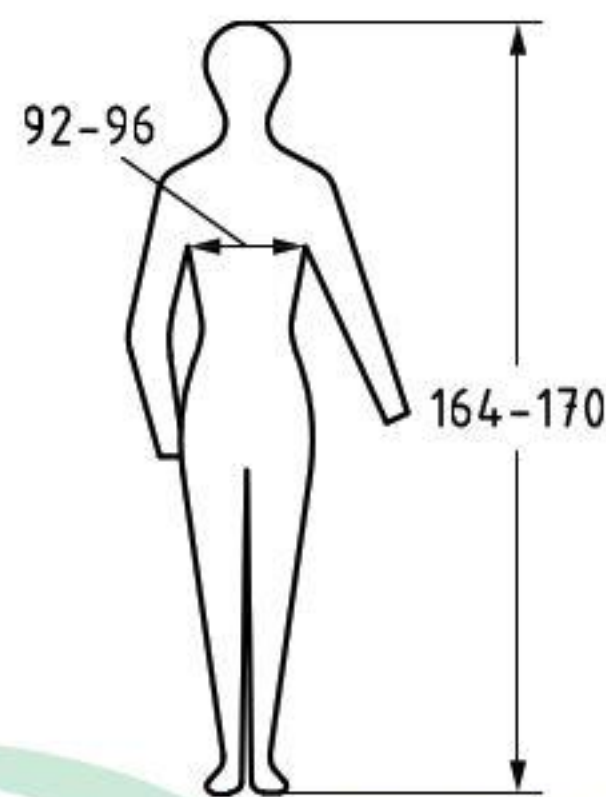



Figure D.1 — Minimum requirements for suits, jackets and coats

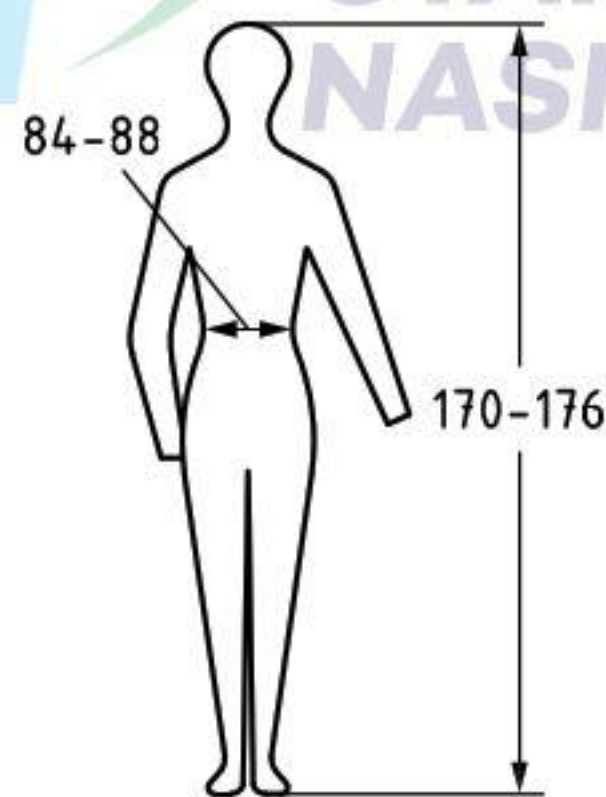



Figure D.2 — Minimum requirements for trousers

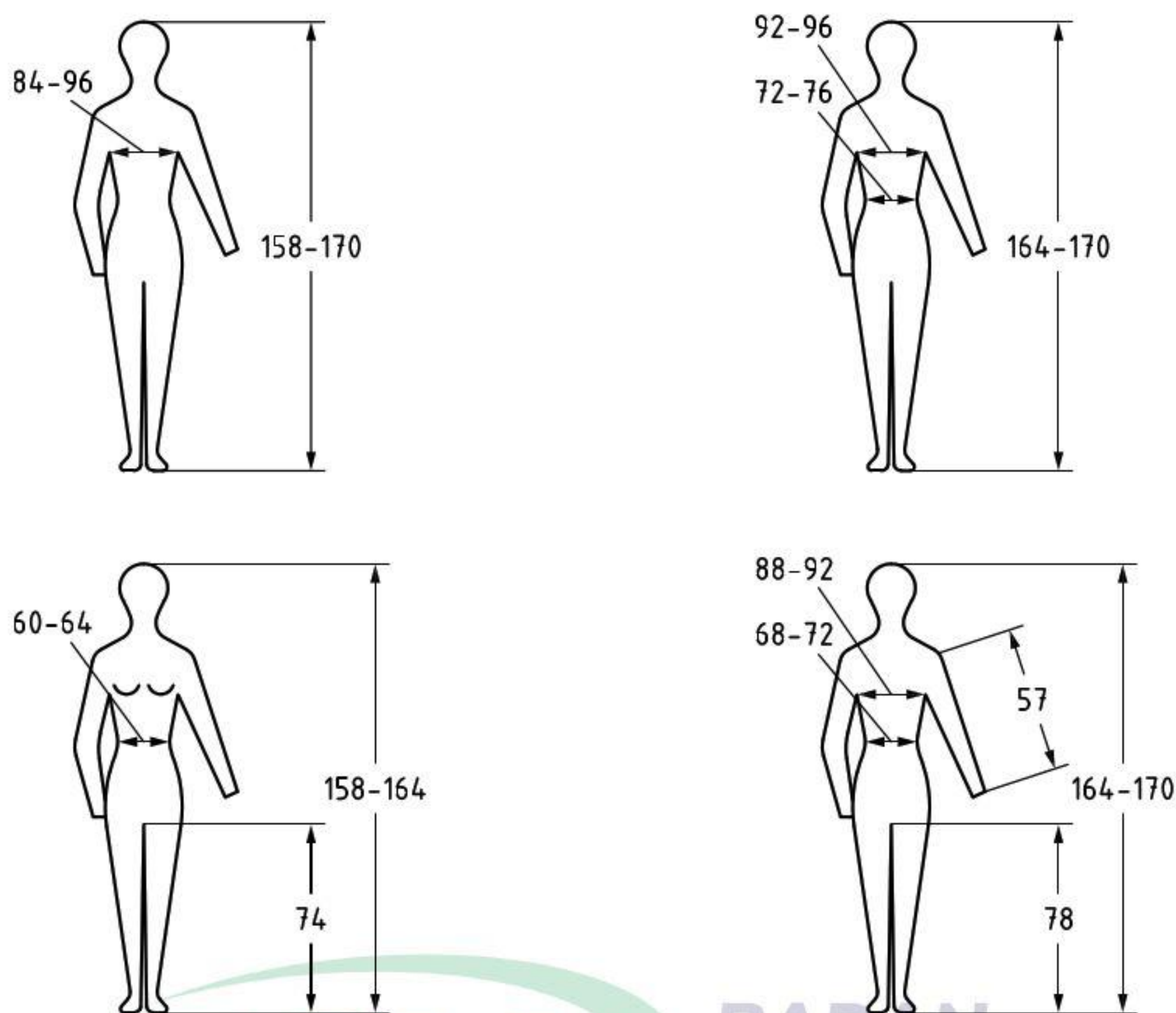



Figure D.3 — Other possibilities

D.2 Example of size designation for torso protector

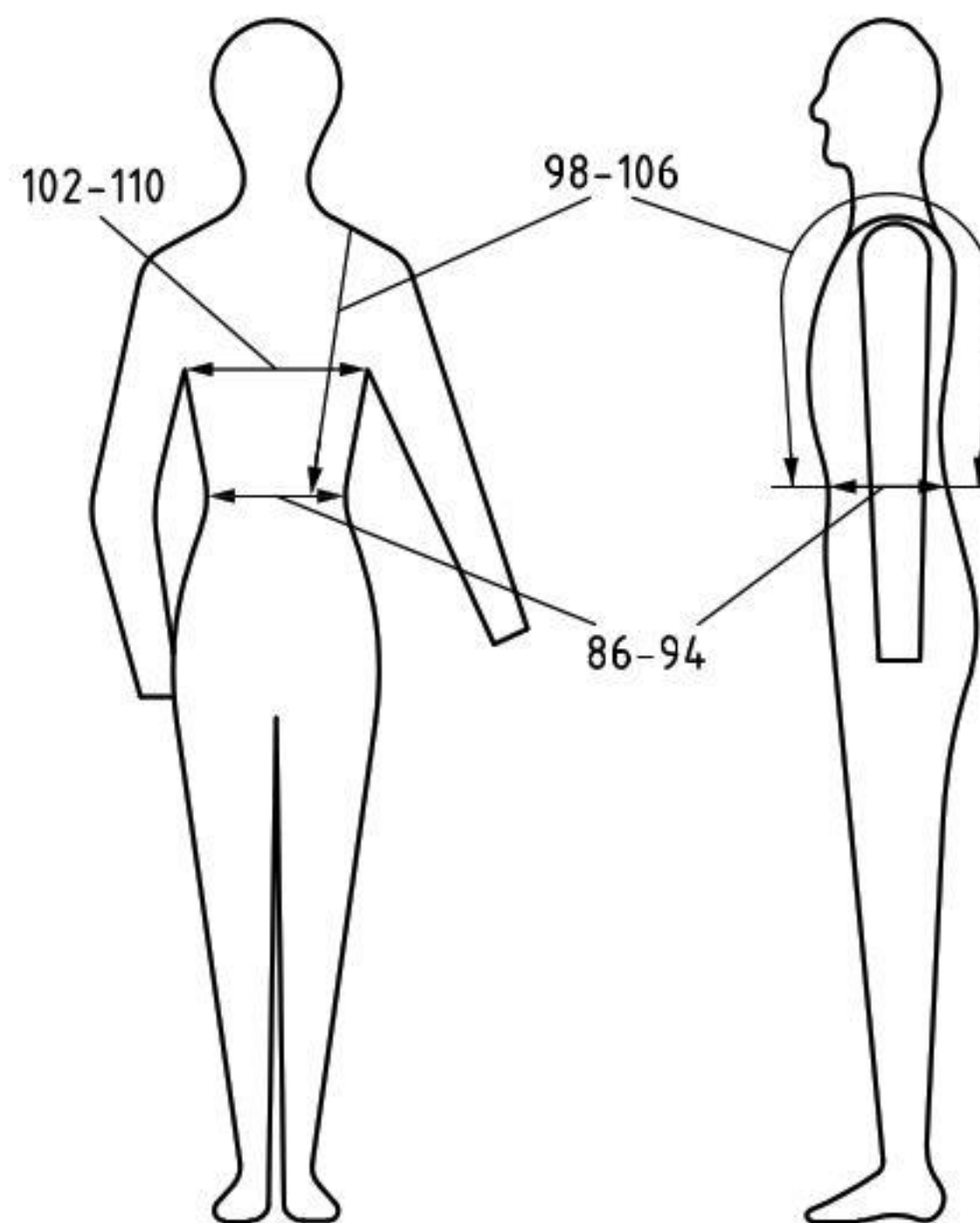
All dimensions are in centimetres.

NOTE The size designation for women uses the bust girth (and under bust girth) rather than the chest girth.

Figure D.4 — Torso protector for men

Annex E
(normative)

Pictograms

Table E.1 — Pictograms

Pictograms	Intended protection
	Protection against ionising radiation ISO 7000-2809
	Protection against moving parts ISO 7000-2411
	Protection against cold ISO 7000-2412
	Protection against foul weather ISO 7000-2413
	Protection against chemicals ISO 7000-2414
	Protection against static electricity ISO 7000-2415
NOTE Pictograms in the shape of a shield indicate the hazard the clothing is intended to protect against. The type of hazard is symbolised by the Figure inside the shield frame.	

Table E.1 *(continued)*

Pictograms	Intended protection
	Protection against chain saw ISO 7000-2416
	Protection against heat and flame ISO 7000-2417
	Protection against cuts and stabs ISO 7000-2483
	Protection against particulate radioactive contamination ISO 7000-2484
	Protection against micro-organism hazards ISO 7000-2491
	Protection against welding ISO 7000-2683
NOTE Pictograms in the shape of a shield indicate the hazard the clothing is intended to protect against. The type of hazard is symbolised by the Figure inside the shield frame.	

Table E.2 — Pictograms indicating the intended application of the protective clothing

	Protective clothing (equipment) for fire fighters ISO 7000-2418
	High visibility protective clothing (equipment) ISO 7000-2419
	Protective clothing (equipment) for abrasive blasting operators ISO 7000-2482
	Protective clothing (equipment) for motorcycle riders ISO 7000-2618

NOTE Pictograms in the shape of a square indicate the intended application of the clothing. The type of application is symbolised by the Figure inside the square frame (see Figure E.1).

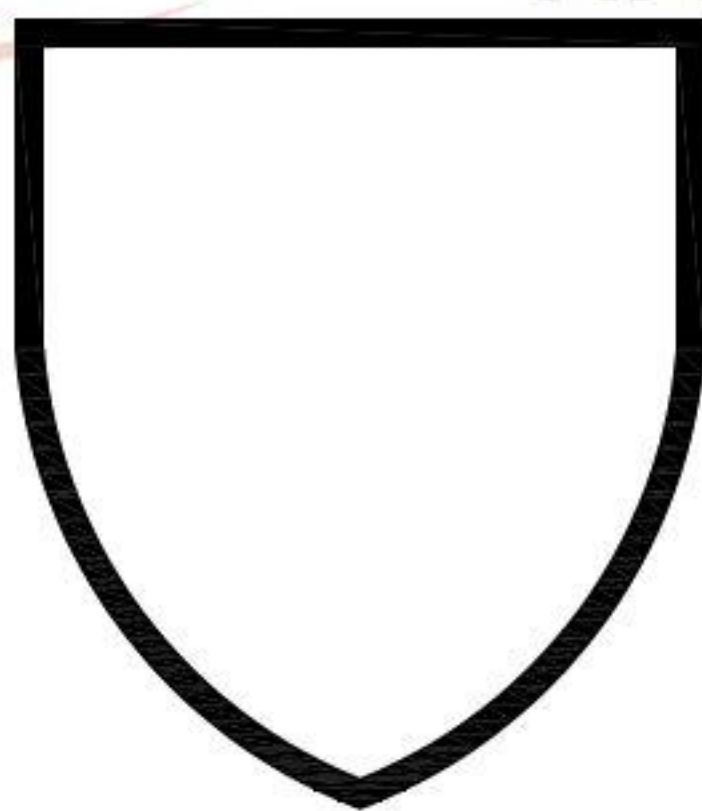



Figure E.1 — ISO 7000-2410: Basic symbol for protection

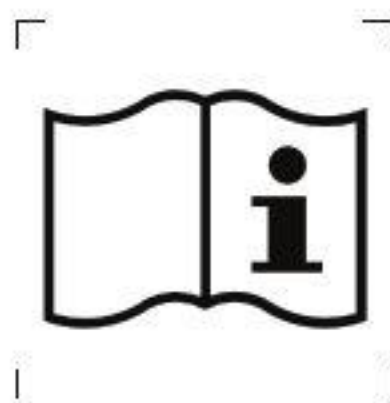



Figure E.2 — ISO 7000-1641: Operation instructions

Annex F
(informative)

Environmental aspects

Every product has an impact on the environment during all stages of its life-cycle, e.g. extraction of resources, acquisition of raw materials, production, testing, distribution, use (application), reuse, end-of-life treatment, including final disposal. These impacts range from slight to significant; they can be short-term or long-term; and they occur at global, regional or local level. Provisions in product standards have an influence on environmental impacts of products.

The need to reduce the potential adverse impacts on the environment of a product that can occur during all stages of its life is recognized around the world. The potential environmental impacts of products can be reduced by taking into account environmental issues in product standards.

During the life-cycle of a given product, different environmental aspects can be determined.

The aim is to promote a reduction of potential adverse environmental impacts caused by products.

(For information, an environmental checklist is given below. The purpose of the environmental checklist is to explain whether the standard covers relevant product environmental aspects and, if so, how they are dealt with in the draft.)

By no means shall these environmental aspects interfere with the basic health and safety requirements in this International Standard. In any case the requirements of this International Standard prevails over any environmental aspect that might be related to this product.

The following environmental aspects should be considered:

a) Materials should be selected to optimize product durability and lifetime and consideration should be made to avoid the selection of rare or hazardous materials.

b) Consideration should be made to using recycled or reused materials, and to selecting of materials which can then be subsequently recycled.

c) The possibility of marking components to aid in their sorting for disposal/recycling at end of life should also be reviewed.

d) Packaging design should consider using recycled materials, and materials that need little energy for their manufacture, and that minimize waste.

e) Packaging design should consider subsequent reuse and recycling.

f) The size and weight of packaging should be minimized while protecting the products to minimize waste through damage. Packaging should be designed to optimize capacity of transportation vehicles while facilitating safe loading and unloading.

g) Test materials should be used and disposed of properly, according to their manufacturer instructions and to the enforced law in respect of environmental protection.

h) Test facilities, test equipment and tools must be designed to minimize the risk of leakage into the environment.

i) Maximum use should be made of high efficiency motors, lighting and displays.

j) The design should facilitate the manufacturing of the product and packaging using tools which minimize the generation of noise and vibration.

Bibliography

[1] ISO 105, *Textiles — Test for colour fastness (all parts)*

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